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Ms. Laura Alvey  
Groundwater Remediation Program  
Remediation Division  
Montana Department of Environmental Quality  
P.O. Box 200901  
Helena, MT 59620-0901

February 8, 2007

**RE: November 2006 Groundwater Monitoring Report for Coulson Park Release  
Billings, Montana**

Dear Ms. Alvey:

Attached is the November 2006 Groundwater Monitoring Report for the ConocoPhillips Coulson Park Release Site located in Billings, Montana. This site is being monitored annually. As with previous monitoring events, impacts were detected in monitoring wells MW-1 and MW-3. In general, the results are similar to previous monitoring events. Although there have been fluctuations in hydrocarbon concentrations over time, a significant decline in hydrocarbon concentrations has occurred since monitoring began in 2000. The data also indicate that natural attenuation processes are occurring at the site. The next groundwater monitoring event is scheduled for November 2007.

Please call me at 406-255-2672 if you have any questions regarding the enclosed report.

Sincerely,

A handwritten signature in cursive script that reads "William J. Muldoon".

William J. Muldoon

Enc.

Cc: Tetra Tech



February 5, 2007

Mr. William J. Muldoon  
Site Manager-Central Region  
Risk Management and Remediation  
ConocoPhillips Company  
P.O. Box 30198  
Billings, MT 59107-0198

**SUBJECT: November 2006 Groundwater Monitoring Summary  
Coulson Park 1976 Seminole Pipe Line Release Site, Billings, Montana  
ConocoPhillips Site No. 6625  
Maxim Project No. 2000428A.200**

Dear Mr. Muldoon:

This letter summarizes results of groundwater monitoring activities conducted by Tetra Tech (formerly Maxim Technologies) during November 2006 at the location of the Coulson Park 1976 Seminole Pipe Line release in Billings, Montana (Figure 1). The site is on an annual monitoring schedule and the previous monitoring event was conducted during November 2005 (Maxim, 2006a).

This work was conducted in general accordance with Maxim's work plan for monitoring activities for the project (Maxim, 2006b). Activities conducted during the November 2006 annual groundwater monitoring event are as follows:

- Depth to groundwater was measured in seven site monitoring wells (MW-1 through MW-3 and CCP-MW-1 through CCP-MW-4; Figure 2).
- Field parameters, consisting of dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature and pH, were measured in wells MW-1, MW-3, and CCP-MW-1. Groundwater samples were collected from these three wells in accordance with the methods described on the attached groundwater sampling logs (Attachment A). A duplicate groundwater sample was collected from well MW-3.
- The groundwater samples collected from wells MW-1 and MW-3 were submitted for laboratory analysis of volatile petroleum hydrocarbons (VPH) using Massachusetts Department of Environmental Protection (MDEP) methods (MDEP, 1998).
- The groundwater samples collected from wells MW-1, MW-3, and CCP-MW-1 were submitted for laboratory analysis of the following intrinsic biodegradation indicator (IBI) parameters: nitrate, sulfate, dissolved iron, dissolved manganese, and methane. Analytical reports are contained in Attachment B.

All measuring, sampling, packaging, shipping and documentation were completed in accordance with Maxim's standard operating procedures (SOPs), and all field activities were conducted in accordance with a site-specific health and safety plan (HASP) updated for 2006

monitoring activities. Lancaster Laboratories of Lancaster, Pennsylvania provided laboratory services.

## **GROUNDWATER ELEVATIONS**

Depth to groundwater measurements ranged from approximately 12.2 to 16.3 feet at the Coulson Park site during November 2006 (Table 1). As all wells are completed with aboveground protectors extending approximately three feet above ground surface, groundwater was approximately nine to 13 feet below ground surface (bgs) during November 2006. Groundwater elevations were generally unchanged at the site between November 2005 and November 2006 (Table 1). Depth to groundwater has fluctuated within a range of approximately one foot since monitoring began in 2000 (Table 1).

The potentiometric surface map (Figure 2) indicates that groundwater flowed across the Coulson Park site toward the east-northeast under a gradient of approximately 0.5 percent during November 2006. The November 2006 flow direction and gradient are consistent with those observed during recent monitoring events (Maxim, 2005 and 2006a).

## **GROUNDWATER ANALYTICAL DATA**

Groundwater samples were collected from well CCP-MW-1, representative of the area upgradient of the source, well MW-3, representative of the source area, and well MW-1, representative of the area down-gradient of the source.

### ***Petroleum Hydrocarbon Concentrations***

Petroleum hydrocarbon impacts were detected in wells MW-1 and MW-3 during the November 2006 monitoring event (Table 2; Attachment B). Several VPH analytes were detected in the sample collected from well MW-3, but only the benzene, C<sub>5</sub>-C<sub>8</sub> aliphatics, and C<sub>9</sub>-C<sub>10</sub> aromatics concentrations exceeded Montana Department of Environmental Quality (MDEQ) Risk-Based Screening Levels (RBSLs; MDEQ, 2003). Concentrations of total purgeable hydrocarbons (TPH) and C<sub>5</sub>-C<sub>8</sub> aliphatics were detected in the sample from well MW-1, but these concentrations were J-flagged as estimated values by the laboratory because they fell between the method detection limit (MDL) and the limit of quantitation (LOQ), and these concentrations did not exceed MDEQ RBSLs (MDEQ, 2003) during November 2006.

Concentrations of petroleum hydrocarbons in the sample collected from well MW-3 increased, while concentrations in the sample from well MW-1 were generally unchanged between November 2005 and November 2006 (Table 2). However, since monitoring began in 2000, concentrations in well MW-3 (source area) have decreased by a factor of two to three and those in well MW-1 (downgradient) have decreased by an order of magnitude. The monitoring well network has delineated the extent of groundwater impacts. The restriction of petroleum hydrocarbon impacts in excess of MDEQ RBSLs to well MW-3, and the general overall decreasing level of impacts in both wells MW-1 and MW-3 (Table 2), indicate that the plume of impacted groundwater is stable and shrinking.

A duplicate sample was collected from well MW-3 for QA/QC purposes, and the results were evaluated using relative percent difference (RPD) according to MDEP criteria (MDEP, 1998). All analytes met the QA/QC criteria (RPD<50%) and are considered accurate concentrations.

Details of the duplicate sample QA/QC evaluation are presented in Attachment C.

In their internal laboratory QA/QC evaluation, Lancaster Laboratories (Lancaster) flagged several analyte results with a "J" because they were below their respective quantitation limits. All other internal laboratory QA/QC criteria were met, and all samples were shipped and received in accordance with standard QA/QC criteria (see Attachment C). All samples were received by the laboratory in satisfactory condition, the cooler temperature was received within the acceptable temperature range of  $2^{\circ}\text{C}\pm$ , and all samples were adequately preserved to a pH of  $\leq 2$ . All analyses or original extractions were conducted within method-specific holding times.

### ***Intrinsic Biodegradation Indicator Parameters***

The IBI data collected from wells MW-1, MW-2 and CCP-MW-1 are summarized in Table 3. The DO data indicate that the shallow aquifer at the site is naturally oxygenated, although DO is depleted in the area of impacts. Iron, manganese and methane concentrations are all elevated within the impacted plume. Nitrate and sulfate concentrations are depleted within the impacted plume.

The IBI data suggest that aerobic biodegradation is occurring on the fringes of the dissolved-phase plume, but in the area of impacts, microaerophilic and/or anaerobic biodegradation is occurring through iron reduction, manganese reduction, nitrate reduction, sulfate reduction and methanogenesis. These mechanisms are considered to be the controlling factors in the stability of the plume.

## **SUMMARY**

The data generated during the November 2006 groundwater monitoring event at the Coulson Park 1976 Seminole Pipe Line release site may be summarized as follows:

- Groundwater elevations were essentially unchanged across the site between November 2005 and November 2006. Depth to groundwater measurements have fluctuated within a range of approximately one foot since monitoring began in 2000.
- Groundwater flow across the site was toward the east-northeast under a gradient of approximately 0.5 percent during November 2006. The November 2006 flow direction and gradient are consistent with those observed during previous monitoring events.
- VPH analytes were detected in source area well MW-3, but only the benzene,  $\text{C}_5\text{-C}_8$  aliphatics, and  $\text{C}_9\text{-C}_{10}$  aromatics concentrations exceeded MDEQ RBSLs. Petroleum hydrocarbons were detected in the sample from downgradient well MW-1 at concentrations below the LOQ.
- Since monitoring began in 2000, concentrations in well MW-3 (source area) have decreased by a factor of two to three and those in well MW-1 (downgradient) have decreased by an order of magnitude.
- The plume of impacted groundwater at the Coulson Park site is stable and petroleum hydrocarbon concentrations are decreasing as a result of natural biodegradation.

Mr. William J. Muldoon  
February 5, 2007  
Page 4

Please call us if you have any questions about this report or any aspect of the project. We appreciate the opportunity to serve your environmental consulting needs.

Sincerely,

**Tetra Tech**

A handwritten signature in blue ink, reading "David L. Tyler".

David L. Tyler, P.G.  
Project Manager

A handwritten signature in blue ink, reading "Brian H. McHugh".

Brian H. McHugh, P.G.  
Office Manager

BHM/DLT/rr

Figures

Figure 1 - Site Location Map

Figure 2 – Groundwater Contour Map, November 27, 2006

Tables

Table 1 - Groundwater Elevation Data

Table 2 - Volatile Petroleum Hydrocarbon Concentrations in Groundwater

Table 3 - Intrinsic Biodegradation Indicator Data

Attachment A: Groundwater Sampling Logs

Attachment B: Laboratory Analytical Reports

Attachment C: QA/QC Evaluation

(in two copies)

n:\typing\Env-fac\2000428A\Nov 2006 GWM Summary\CCP 2006 GMR Text.doc

## REFERENCES

Maxim, 2005. November 2004 Groundwater Monitoring Summary, Coulson Park 1976 Seminole Pipe Line Release Site, Billings, Montana. Report submitted to ConocoPhillips. January 14.

Maxim, 2006a. November 2005 Groundwater Monitoring Summary, Coulson Park 1976 Seminole Pipe Line Release Site, Billings, Montana. Report submitted to ConocoPhillips. March 1.

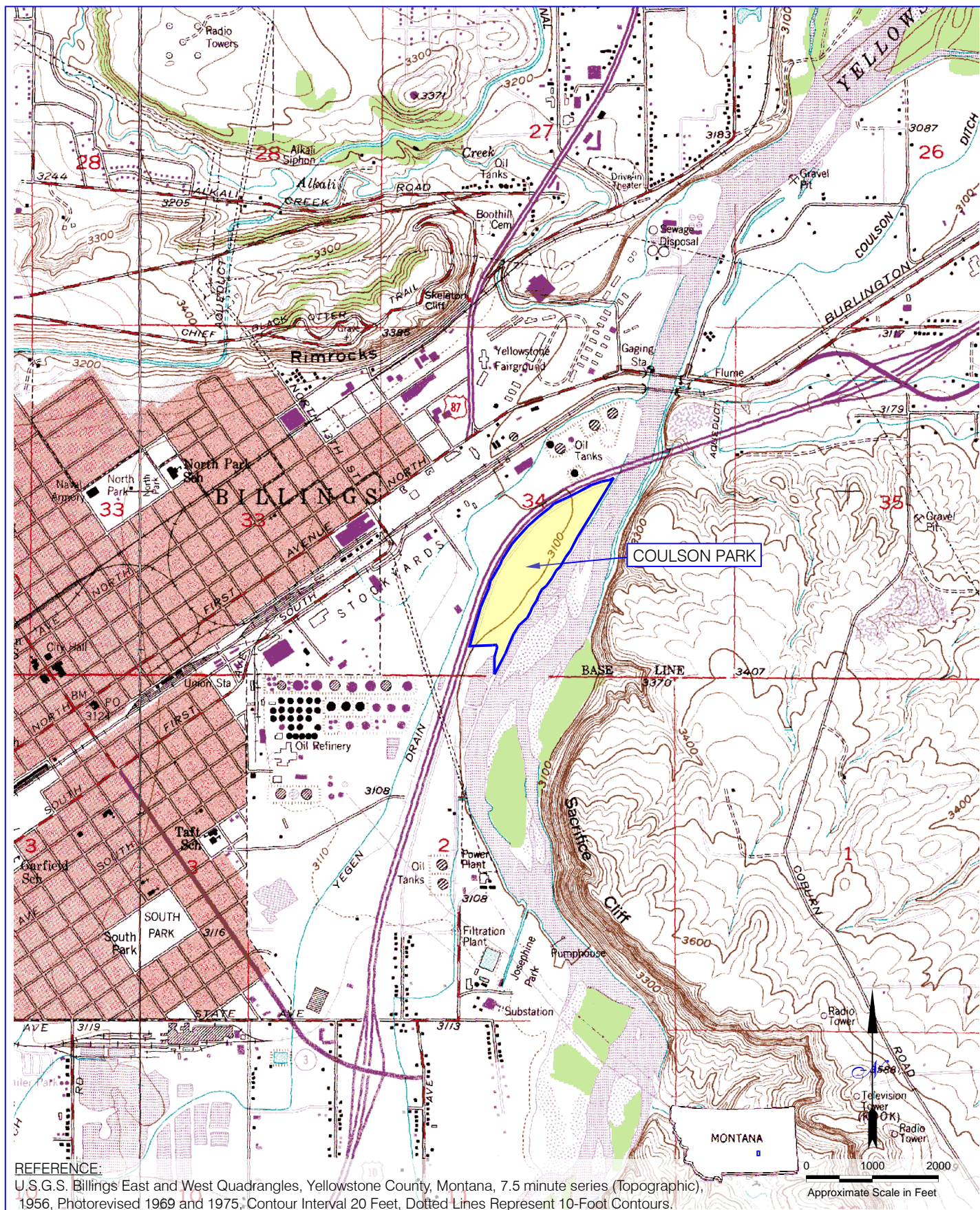
Maxim, 2006b. 2003 Groundwater Monitoring Activities Work Plan, Coulson Park 1976 Seminole Pipe Line Release Site, Billings, Montana. Work plan submitted to ConocoPhillips, September 19.

MDEP, 1998. Method for Determination of Volatile Petroleum Hydrocarbons (VPH), Massachusetts Department of Environmental Protection, January.

MDEQ, 2003. *Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases*, Montana Department of Environmental Quality, Helena, MT, October

## FIGURES



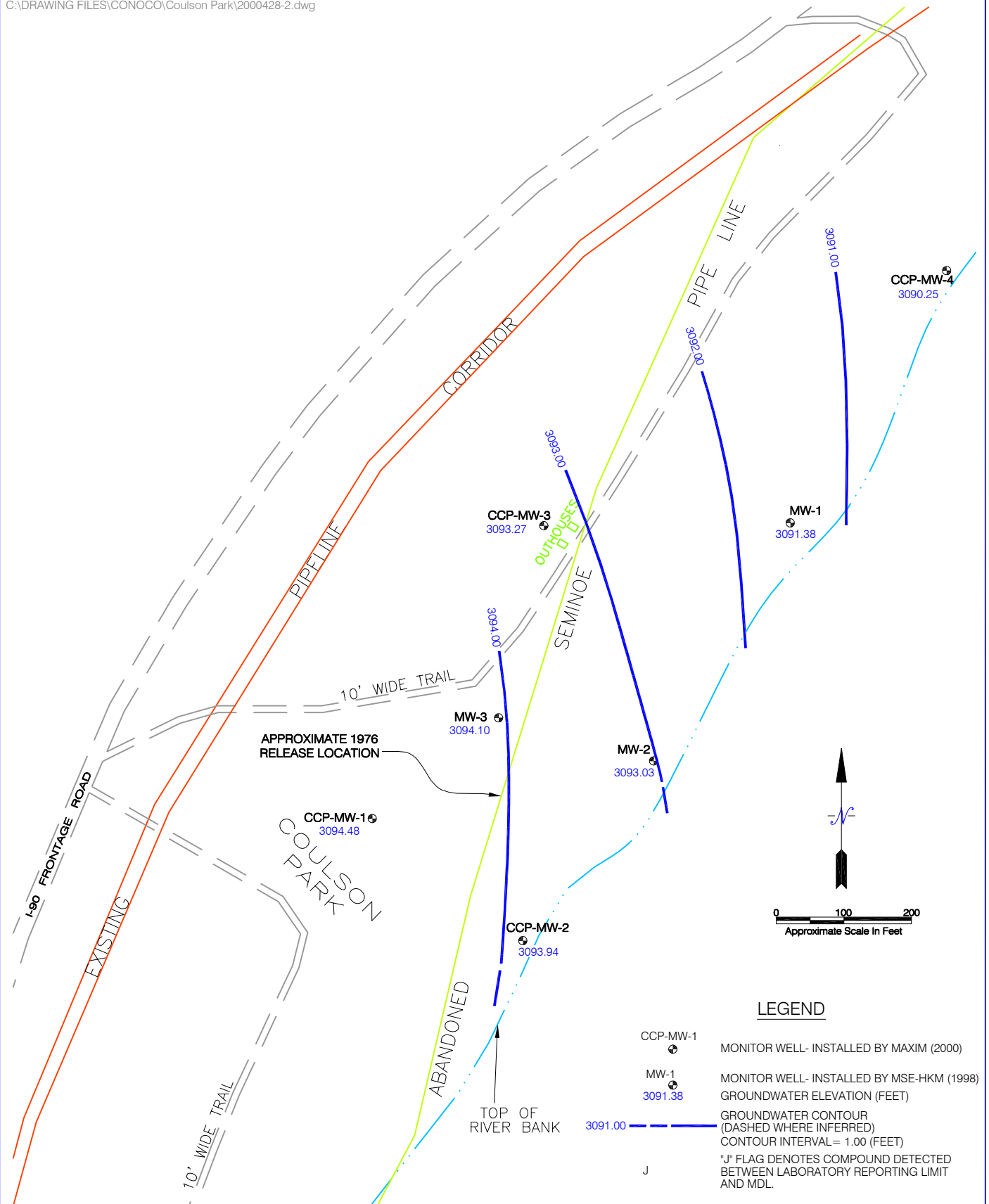


**SITE LOCATION MAP**  
 1976 Seminole Pipe Line Release  
 Coulson Park  
 Yellowstone County, Montana

DATE: 02/02/2007  
 REVIEWED: DLT  
 PROJ. NO.: 2000428

DRAWN BY: MGK  
 APPROX. SCALE: 1"=2000'  
 FIGURE NO.: 1





**GROUNDWATER CONTOUR MAP**  
November 27, 2006  
Coulson Park 1976 Seminoe Pipe Line Release  
Yellowstone County, Montana

DATE: 02/06/2007  
REVIEWED: MGE  
PROJ. NO. 2000428

DRAWN BY: MGK  
SCALE: 1"=200'  
FIGURE NO. 2

## TABLES

**Table 1**  
**Groundwater Elevation Data**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**

Well ID and PVC Casing Elevation (feet AMSL) <sup>1,2</sup>	Date	Depth to Groundwater (feet) <sup>3</sup>	Groundwater Elevation (feet AMSL)	Elevation Difference from Previous Event (feet)
CCP-MW-1 3106.79	04/13/00	15.05	3091.74	
	01/24/01	15.36	3091.43	-0.31
	04/18/01	15.46	3091.33	-0.10
	07/24/01	14.20	3092.59	1.26
	10/22/01	14.93	3091.86	-0.73
	05/14/02	14.75	3092.04	0.18
	11/11/02	15.14	3091.65	-0.39
	05/21/03	14.24	3092.55	0.90
	11/19/03	15.25	3091.54	-1.01
	05/18/04	14.65	3092.14	0.60
	11/09/04	14.79	3092.00	-0.14
	11/17/05	14.84	3094.43	NA
	11/27/06	14.79	3094.48	0.05
CCP-MW-2 3105.22	04/13/00	13.61	3091.61	
	01/24/01	14.12	3091.10	-0.51
	04/18/01	14.27	3090.95	-0.15
	07/24/01	13.24	3091.98	1.03
	10/22/01	13.53	3091.69	-0.29
	05/14/02	13.20	3092.02	0.33
	11/11/02	13.85	3091.37	-0.65
	05/21/03	12.45	3092.77	1.40
	11/19/03	13.98	3091.24	-1.53
	05/18/04	13.27	3091.95	0.71
	11/09/04	13.53	3091.69	-0.26
	11/17/05	13.66	3094.06	NA
	11/27/06	13.78	3093.94	-0.12
CCP-MW-3 3107.07	04/13/00	16.78	3090.29	
	01/24/01	16.96	3090.11	-0.18
	04/18/01	17.09	3089.98	-0.13
	07/24/01	15.92	3091.15	1.17
	10/22/01	16.77	3090.30	-0.85
	05/14/02	16.58	3090.49	0.19
	11/11/02	16.78	3090.29	-0.20
	05/21/03	16.12	3090.95	0.66
	11/19/03	16.83	3090.24	-0.71
	05/18/04	16.39	3090.68	0.44
	11/09/04	16.42	3090.65	-0.03
	11/17/05	16.40	3093.16	NA
	11/27/06	16.29	3093.27	0.11
CCP-MW-4 3100.70	04/13/00	13.72	3086.98	
	01/24/01	13.68	3087.02	0.04
	04/18/01	13.81	3086.89	-0.13
	07/24/01	12.71	3087.99	1.10
	10/22/01	13.35	3087.35	-0.64
	05/14/02	12.98	3087.72	0.37
	11/11/02	13.19	3087.51	-0.21
	05/21/03	11.72	3088.98	1.47
	11/19/03	13.37	3087.33	-1.65
	05/18/04	12.69	3088.01	0.68
	11/09/04	12.85	3087.85	-0.16
	11/17/05	13.02	3090.18	NA
	11/27/06	12.95	3090.25	0.07

**Table 1**  
**Groundwater Elevation Data**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**

Well ID and PVC Casing Elevation (feet AMSL) <sup>1,2</sup>	Date	Depth to Groundwater (feet) <sup>3</sup>	Groundwater Elevation (feet AMSL)	Elevation Difference from Previous Event (feet)
<b>MW-1</b> <b>3102.21</b>          <b>3104.69</b>	04/13/00	13.75	3088.46	
	01/24/01	13.81	3088.40	-0.06
	04/18/01	14.01	3088.20	-0.20
	07/24/01	13.47	3088.74	0.54
	10/22/01	13.73	3088.48	-0.26
	05/14/02	13.53	3088.68	0.20
	11/11/02	13.66	3088.55	-0.13
	05/21/03	12.96	3089.25	0.70
	11/19/03	13.71	3088.50	-0.75
	05/18/04	13.36	3088.85	0.35
	11/09/04	13.39	3088.82	-0.03
	11/17/05	13.38	3091.31	NA
	11/27/06	13.31	3091.38	0.07
<b>MW-2</b> <b>3102.70</b>          <b>3105.19</b>	04/13/00	12.23	3090.47	
	01/24/01	12.51	3090.19	-0.28
	04/18/01	12.66	3090.04	-0.15
	07/24/01	11.87	3090.83	0.79
	10/22/01	12.16	3090.54	-0.29
	05/14/02	11.87	3090.83	0.29
	11/11/02	12.29	3090.41	-0.42
	05/21/03	11.42	3091.28	0.87
	11/19/03	13.37	3089.33	-1.95
	05/18/04	11.78	3090.92	1.59
	11/09/04	11.98	3090.72	-0.20
	11/17/05	12.09	3093.10	NA
	11/27/06	12.16	3093.03	-0.07
<b>MW-3</b> <b>3106.06</b>          <b>3108.55</b>	04/13/00	14.70	3091.36	
	01/24/01	15.01	3091.05	-0.31
	04/18/01	15.11	3090.95	-0.10
	07/24/01	13.90	3092.16	1.21
	10/22/01	14.60	3091.46	-0.70
	05/14/02	14.31	3091.75	0.29
	11/11/02	14.79	3091.27	-0.48
	05/21/03	13.83	3092.23	0.96
	11/19/03	14.87	3091.19	-1.04
	05/18/04	14.24	3091.82	0.63
	11/09/04	14.44	3091.62	-0.20
	11/17/05	14.50	3094.05	NA
	11/27/06	14.45	3094.10	0.05

1. AMSL = Above Mean Sea Level

2. Wells were resurveyed in September 2005, to coordinate survey data with that from the ConocoPhillips refinery. All groundwater elevations, beginning in 2005, are calculated using the new survey data

3. Depth to groundwater measured from the top of well casings, all of which are approximately 3 feet above ground surface.

**Table 2**  
**Volatile Petroleum Hydrocarbon Concentrations in Groundwater**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**  
**(Concentrations in micrograms per liter)**

Well ID	Date	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX	MTBE	Naphthalene	C <sub>5</sub> - C <sub>8</sub> Aliphatics	C <sub>9</sub> - C <sub>12</sub> Aliphatics	C <sub>9</sub> - C <sub>10</sub> Aromatics
MDEQ RBSL <sup>A</sup>		NE	5	1,000	700	10,000	NE	30	100	400	400	50 <sup>B</sup>
CCP-MW-1	04/13/00	<500	<1	<1	<1	<3	<6	<2.0	<2	<240	<100	<60
	01/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	04/13/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	07/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	10/22/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	1.7	<20	<20	<20
	05/14/02	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/21/03	<200	<1	<1	<1	<3	<6	<2	<2	<100	<100	<20
	05/18/04	Not Sampled										
	11/09/04	Not Sampled										
	11/17/05	Not Sampled										
	11/27/06	Not Sampled										
CCP-MW-2	04/13/00	<500	<1	<1	<1	<3	<6	<2.0	<2	<240	<100	<60
	01/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	04/13/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	1.5	<20	<20	<20
	07/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	10/22/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/14/02	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/21/03	<200	<1	<1	<1	<3	<6	<2	<2	<100	<100	<20
	05/18/04	Not Sampled										
	11/09/04	Not Sampled										
	11/17/05	Not Sampled										
	11/27/06	Not Sampled										

**Table 2**  
**Volatile Petroleum Hydrocarbon Concentrations in Groundwater**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**  
**(Concentrations in micrograms per liter)**

Well ID	Date	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX	MTBE	Naphthalene	C <sub>5</sub> - C <sub>8</sub> Aliphatics	C <sub>9</sub> - C <sub>12</sub> Aliphatics	C <sub>9</sub> - C <sub>10</sub> Aromatics
MDEQ RBSL <sup>A</sup>		NE	5	1,000	700	10,000	NE	30	100	400	400	50 <sup>B</sup>
CCP-MW-3	04/13/00	<500	<1	<1	<1	<3	<6	<2.0	<2	<240	<100	<60
	01/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	04/12/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	07/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	07/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	10/22/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/14/02	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	1.4	<20	<20	<20
	05/21/03	<200	<1	<1	<1	<3	<6	<2	<2	<100	<100	<20
	5/21/2003 D	<200	<1	<1	<1	<3	<6	<2	<2	<100	<100	<20
	05/18/04	Not Sampled										
	11/09/04	Not Sampled										
	11/17/05	Not Sampled										
	11/27/06	Not Sampled										
CCP-MW-4	04/13/00	<500	<1	<1	<1	<3	<6	<2.0	<2	<240	<100	<60
	01/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	04/13/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	07/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	1.7	<20	<20	<20
	10/22/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/14/02	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/21/03	<200	<1	<1	<1	<3	<6	<2	<2	<100	<100	<20
	05/18/04	<200	<1	<1	<1	<3	<6	<2	<5	<100	<100	<20
	11/09/04	Not Sampled										
	11/17/05	Not Sampled										
	11/27/06	Not Sampled										



**Table 2**  
**Volatile Petroleum Hydrocarbon Concentrations in Groundwater**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**  
**(Concentrations in micrograms per liter)**

Well ID	Date	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX	MTBE	Naphthalene	C <sub>5</sub> - C <sub>8</sub> Aliphatics	C <sub>9</sub> - C <sub>12</sub> Aliphatics	C <sub>9</sub> - C <sub>10</sub> Aromatics
MDEQ RBSL <sup>A</sup>		NE	5	1,000	700	10,000	NE	30	100	400	400	50 <sup>B</sup>
MW-1	04/13/00	1,500	6	1	106	<3	113	<2.0	25	830	<100	270
	01/24/01	810	6.6	1.6	40	1.7	49.9	7.6	22	520	61	130
	04/12/01	1,100	9.3 (8.0)	2.3 (2.0)	48 (52)	2.4 (<1.0)	62 (62)	16 (<1.0)	31	810	85	200
	07/24/01	620	6.7 (6.2)	0.88 (<1.0)	20 (21)	0.67 (<1.0)	28.25(27.2)	12 (<1.0)	6.9	450	74	84
	10/22/01	450	6.0 (6.0)	1.3 (<1.0)	5.8 (6.4)	0.77 (<2.0)	13.87 (12.4)	9.4 (<1.0)	8.7	330	24	93
	05/14/02	390	3.1	0.81	1.6	<0.50	5.51	5.7	5.8	290	21	60
	11/11/02	280	2.9	1.2	23	1.1	28	<2.0	7.1	140	37	54
	05/21/03	310	1	<1	10	<3	11	<2	9	230	<100	71
	11/19/03	382	4.04	2.13 (J)	2.64 (J)	2.39 (J)	11.20	<2.00	16.5	226	75.2 (J)	70 (J)
	11/19/03 D	283	3.29	1.75 (J)	1.14 (J)	1.81 (J)	7.99	<2.00	13.1	159	60.5 (J)	54.8 (J)
	05/18/04	460	2	<1	3	<3	5	<2	6	410	<100	71
	11/09/04	349	2.87	1.31 (J)	0.6 (J)	<1	4.78	<2	5.3	204	56.3 (J)	82.6 (J)
	11/17/05	86.4 (J)	1.47	0.9 (J)	<0.5	<1.0	2.37	<2	<1.0 (J)	<50	<20	<20
	11/17/05 D	84.9 (J)	1.39	0.8 (J)	<0.5	1.10 (J)	3.29	<2	2.82 (J)	<50	<20	20.8 (J)
	11/27/06	96.6 (J)	<0.5	<0.5	<0.5	<1	<2.5	<2	<1	71.4 (J)	<20	<20
MW-2	04/13/00	<500	<1	<1	<1	<3	<6	<2.0	<2	<240	<100	<60
	01/24/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	04/13/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	07/24/01	25	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	10/22/01	<20	<0.50	<0.50	<0.50	<0.50	<2	<2.0	<1.0	<20	<20	<20
	05/14/02	28	<0.50	<0.50	<0.50	<0.50	<2	<2.0	1.1	20	<20	<20
	05/21/03	<200	<1	<1	<1	<3	<6	<2	<2	<100	<100	<20
	05/18/04	<200	<1	<1	<1	<3	<6	<2	<5	<100	<100	<20
	11/09/04	Not Sampled										
	11/17/05	Not Sampled										
	11/27/06	Not Sampled										

**Table 2**  
**Volatile Petroleum Hydrocarbon Concentrations in Groundwater**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**  
**(Concentrations in micrograms per liter)**

Well ID	Date	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX	MTBE	Naphthalene	C <sub>5</sub> - C <sub>8</sub> Aliphatics	C <sub>9</sub> - C <sub>12</sub> Aliphatics	C <sub>9</sub> - C <sub>10</sub> Aromatics
MDEQ RBSL <sup>A</sup>		NE	5	1,000	700	10,000	NE	30	100	400	400	50 <sup>B</sup>
MW-3	04/13/00	3,600	<b>568</b>	8	221	47	844	<10	10	<b>2,000</b>	130	<b>500</b>
	01/24/01	2,800	<b>460</b>	9	140	26	635	<b>35</b>	9.2	<b>1,700</b>	180	<b>320</b>
	01/24/01 D	2,900	<b>460</b>	11	140	28	639	<b>37</b>	7.8	<b>1,800</b>	190	<b>330</b>
	04/12/01	1,600	<b>190 (170)</b>	4.2 (4.4)	70 (82)	9.7 (12)	273.9 (268.4)	27 (<2.0)	3.9	<b>1,100</b>	94	<b>210</b>
	04/12/01 D	1,300	<b>140</b>	3.8	54	6.2	204	21	3.2	<b>930</b>	93	<b>180</b>
	07/24/01	2,900	<b>580 (580)</b>	7.2 (<10)	130 (140)	11 (10)	728(730)	29 (<10)	9.1	<b>1,700</b>	280	<b>450</b>
	10/22/01	1,000	<b>90 (85)</b>	2.2 (1.2)	27 (29)	2.6 (2.8)	121.8 (118)	18 (<1)	2.6	<b>750</b>	62	<b>160</b>
	10/22/01 D	900	<b>77</b>	2.1	22	2.2	103.3	15	1.8	<b>670</b>	65	<b>140</b>
	05/14/02	700	<b>58</b>	1.6	15	1.4	76	5.6 (J)	4.0 (J)	<b>450</b>	30	<b>120</b>
	05/14/02 D	770	<b>67</b>	2.0	17	1.5	87.5	8.9 (J)	1.8 (J)	<b>500</b>	37	<b>120</b>
	11/11/02	1,500	<b>230</b>	3.3	75	4.1 (J)	308.3	16	4.7	<b>760</b>	160	<b>240</b>
	11/11/02 D	1,500	<b>230</b>	3.5	79	5.9 (J)	312.5	16	5.2	<b>760</b>	170	<b>240</b>
	05/21/03	380	<b>25</b>	<1	5	<3	30	<1	<2	270	<100	75
	11/19/03	1,160	<b>149</b>	2.64 (J)	21.1	1.60 (J)	174	<2.00	2.70 (J)	<b>617</b>	188	<b>181</b>
	05/18/04	530	<b>81</b>	1	6	<3	88	<2	<5	360	<100	<b>93</b>
	5/18/04 D	600	<b>84</b>	1	7	<3	92	<2	<5	<b>420</b>	<100	<b>100</b>
	11/09/04	496	<b>70.9</b>	1.28 (J)	1.59 (J)	<1	73.8	<2	1.18 (J)	255	65.9 (J)	<b>101</b>
	11/09/04 D	497	<b>71.1</b>	1.27 (J)	1.64 (J)	<1	74	<2	1.10 (J)	255	66.6 (J)	<b>101</b>
	11/17/05	782	<b>127</b>	1.81 (J)	1.35 (J)	1.30 (J)	131.45	3.67 (J)	2.80 (J)	<b>431</b>	82.3 (J)	<b>133</b>
	11/27/06	1,140	<b>249</b>	2.52 (J)	2.58 (J)	1.52 (J)	255.62	<2	3.49 (J)	<b>621</b>	100	<b>167</b>
	11/27/06 D	1,150	<b>243</b>	2.46 (J)	2.50 (J)	1.59 (J)	249.55	<2	2.69 (J)	<b>644</b>	93.1 (J)	<b>161</b>

A: RBSL, Risk-Based Screening Level, Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases. Montana Department of Environmental Quality, Helena, MT, October, 2003.

B: The RBSL for the C<sub>9</sub>-C<sub>10</sub> Aromatics was lowered from 100 ug/L to 50 ug/L in October, 2003. Therefore, values exceeding 50 ug/L are bolded only after that date.

NE: RBSL not established.

Bold text indicates exceedance of *Risk Based Screening Levels*.

( ) Concentrations in parentheses are results of 8260B second method confirmation analysis.

(J): Estimated Value = The result falls within the Method Detection Limit (MDL) and Limit of Quantitation (LOQ).

D = duplicate

**Table 3**  
**Intrinsic Biodegradation Indicator Data**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**

Well ID	Date	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Temperature (°C)	pH	Nitrate as N (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)	Methane (µg/L)
CCP-MW-1 Up-gradient	04/13/00	0.00	-445	12.4	7.04	NA	NA	NA	NA	NA
	01/24/01	0.50	19.2	11.5	6.76	NA	NA	NA	NA	NA
	04/13/01	1.06	187	10.5	7.59	NA	NA	NA	NA	NA
	07/24/01	0.74	-42.7	12.8	7.01	NA	NA	NA	NA	NA
	10/22/01	0.00	2.0	26.1	7.10	NA	NA	NA	NA	NA
	05/14/02	1.47	81.7	10.5	7.60	NA	NA	NA	NA	NA
	05/21/03	1.09	113	10.9	7.35	NA	NA	NA	NA	NA
	11/09/04	Not Sampled								
	11/17/05	Not Sampled								
	11/27/06	1.96	129.4	12.9	6.74	0.37	336	<0.05	0.0987	<2
CCP-MW-2 Cross-gradient	04/13/00	0.00	-33.0	13.6	6.83	NA	NA	NA	NA	NA
	01/24/01	0.11	-40.6	12.6	6.79	NA	NA	NA	NA	NA
	04/13/01	0.00	-61	11.3	7.37	NA	NA	NA	NA	NA
	07/24/01	0.00	-51.4	13.5	6.87	NA	NA	NA	NA	NA
	10/22/01	0.00	-41.4	13.4	7.21	NA	NA	NA	NA	NA
	05/14/02	0.18	14.4	11.3	7.33	NA	NA	NA	NA	NA
	05/21/03	0.51	148	11.6	6.71	NA	NA	NA	NA	NA
	11/09/04	Not Sampled								
	11/17/05	Not Sampled								
	11/27/06	Not Sampled								
CCP-MW-3 Background	04/13/00	4.35	91.0	12.1	6.95	<5.0	396	<0.05	0.015	<0.001
	01/24/01	5.57	39.2	11.4	7.09	<0.5	355	<0.05	<0.01	<0.5
	04/12/01	5.69	87	10.1	7.53	0.09	324	<0.05	<0.01	<0.5
	07/24/01	0.75	9.9	12.1	7.13	<0.5	366	<0.05	<0.01	<0.5
	10/22/01	6.21	61.4	13.8	7.43	<0.5	360	0.14	<0.01	<0.5
	05/14/02	2.42	121	10.1	7.55	<0.5	333	<0.05	<0.01	<0.5
	05/21/03	2.22	119	10.4	7.21	0.08	381	<0.05	<0.02	<1.0
	05/18/04	3.82	51.3	10.9	7.27	0.11	385	<0.05	<0.02	<2
	11/09/04	Not Sampled								
	11/17/05	6.96	-103.7	12.8	7.17	<0.015	425	<0.038	<0.00096	<2
	11/27/06	Not Sampled								

**Table 3**  
**Intrinsic Biodegradation Indicator Data**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**

Well ID	Date	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Temperature (°C)	pH	Nitrate as N (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)	Methane (µg/L)
CCP-MW-4 Down-gradient	04/13/00	0.10	70.0	11.9	6.87	NA	NA	NA	NA	NA
	01/24/01	0.36	115	10.4	6.68	NA	NA	NA	NA	NA
	04/13/01	1.23	126	9.6	7.30	NA	NA	NA	NA	NA
	07/24/01	0.97	165	14.8	7.19	NA	NA	NA	NA	NA
	10/22/01	1.64	122	15.9	6.89	NA	NA	NA	NA	NA
	05/14/02	0.96	90.0	10.1	7.40	NA	NA	NA	NA	NA
	05/21/03	1.17	120	10.7	7.22	NA	NA	NA	NA	NA
	05/18/04	2.94	57.8	11.5	7.11	NA	NA	NA	NA	NA
	11/09/04	Not Sampled								
	11/17/05	Not Sampled								
	11/27/06	Not Sampled								
MW-1 Down-gradient	04/13/00	0.00	-140	13.7	6.74	<0.5	206	9.4	0.76	2.1
	01/24/01	0.74	-98.1	11.9	7.06	<0.5	21.7	11.3	0.72	2,700
	04/12/01	0.00	-158	11.6	7.08	<0.05	26	10.7	0.76	3,400
	07/24/01	0.15	-204	12.7	6.70	<0.5	55.8	5.1	0.64	1,000
	10/22/01	0.00	9.3	15.5	7.03	<0.5	36.6	13	0.77	810
	05/14/02	0.29	-123	12.0	7.16	<0.5	122	15	1.1	390
	11/11/02	0.44	-151	14.7	7.20	NA	NA	NA	NA	NA
	05/21/03	0.20	137	11.8	6.91	<0.05	602	1.96	0.87	175
	11/19/03	0.52	24.5	15.4	7.82	NA	NA	NA	NA	NA
	05/18/04	0.76	66.9	12.1	6.90	<0.05	377	6.5	0.88	950
	11/09/04	0.28	-224.0	15.8	7.29	NA	NA	NA	NA	NA
	11/17/05	9.77	-177.9	14.0	6.92	<0.015	18	10.4	0.683	NA
	11/27/06	0.26	-88.4	13.7	6.81	<0.04	700	8.88	0.795	1,100
MW-2 Cross-gradient	04/13/00	0.00	-118	12.2	6.87	NA	NA	NA	NA	NA
	01/24/01	0.00	-3.1	11.4	6.67	NA	NA	NA	NA	NA
	04/13/01	0.00	-149	10.9	7.43	NA	NA	NA	NA	NA
	07/24/01	0.00	-135	13.3	7.04	NA	NA	NA	NA	NA
	10/22/01	0.00	-126	14.7	7.30	NA	NA	NA	NA	NA
	05/14/02	0.35	-72.1	11.2	7.14	NA	NA	NA	NA	NA
	05/21/03	0.48	132	12.7	7.00	NA	NA	NA	NA	NA
	05/18/04	0.05	76.4	11.5	6.74	<0.05	374	1.53	1.52	12
	11/09/04	Not Sampled								
	11/17/05	0.48	175	13.5	6.95	<0.015	319	2.56	1.05	6.1
	11/27/06	Not Sampled								

**Table 3**  
**Intrinsic Biodegradation Indicator Data**  
**Coulson Park 1976 Seminole Pipe Line Release**  
**Billings, Montana**

Well ID	Date	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Temperature (°C)	pH	Nitrate as N (mg/L)	Sulfate (mg/L)	Dissolved Iron (mg/L)	Dissolved Manganese (mg/L)	Methane (µg/L)
<b>MW-3 Impacted</b>	04/13/00	0.00	-224	13.0	7.85	<0.5	113	0.25	0.063	3.7
	01/24/01	0.94	-140	12.3	7.69	<0.5	71.1	0.53	0.072	2,700
	04/12/01	0.00	-316	11.2	8.38	<0.05	112	0.13	0.058	420
	07/24/01	0.00	-197	13.8	7.15	<0.5	11.1	6.4	0.17	2,600
	10/22/01	0.00	-212	14.7	7.06	<0.5	178	0.93	0.091	900
	05/14/02	0.07	-233	12.2	7.18	<0.5	263	5.5	0.23	660
	11/11/02	1.68	-263	14.7	8.05	NA	NA	NA	NA	NA
	05/21/03	0.40	76.1	12.3	8.01	<0.05	252	0.58	0.14	221
	11/19/03	0.52	6.5	15.4	8.24	NA	NA	NA	NA	NA
	05/18/04	0.62	44.1	12.2	7.38	NA	NA	NA	NA	NA
	11/09/04	0.28	-272.0	15.8	7.76	NA	NA	NA	NA	NA
	11/17/05	NM	-208.0	13.7	7.36	NA	NA	NA	NA	NA
	11/27/06	0.12	-170.6	13.1	7.17	<0.04	93.5	8.46	0.116	2,000

mg/L : milligrams per liter  
mV : millivolts

°C : Degrees Centigrade  
NA: Not analyzed

µg/L: micrograms per liter

**ATTACHMENT A**  
**GROUNDWATER SAMPLING LOGS**



# CONOCOPHILLIPS, INC. - GROUNDWATER SAMPLING LOG

Project: COLLISON PARK Sample Date: 11/27/06 Sample Time: 1431 Well ID: MW-1  
 Personnel: RYAN SPARHAWK Weather: Cloudy - 15°  
 Casing Diameter/Type: 2" PVC Measuring Point Description: NORTH  
 Well Depth (feet below measuring point): 18.25 Depth to Water: 13.31 ft water  
 Screen: \_\_\_\_\_ Depth to Product: \_\_\_\_\_  
 J-TUBE: YES or ☒ NO If yes indicate the depth below static water the tube was raised to Before Sampling: \_\_\_\_\_

## WELL EVACUATION

Method: ☐ Mechanical Bailer, ☐ Galvanized Bailer, ☐ PVC Bailer, ☐ Disp. Polyethylene Bailer, ☐ SST Bailer, ☐ Submersible Pump, ☐ Low Flow, ☒ Per Pump  
4.14 Fl. water x .163 gal./ft. = one casing volume .8 gals. x 3 = purge volume 2.4 gals.

SCH 40 Pipe 2" well = 0.163 gal./ft. 4" well = 0.653 gal./ft. 6" well = 1.469 gal./ft. 8" well = 2.611 gal./ft. Any Well C feet in radius =  $3.14 \times R^2 \times L$

Water Quality: \_\_\_\_\_ ODOR: YES or NO SHEEN: YES or NO

Comments: \_\_\_\_\_

## EVACUATION DATA

Time	Galons	Temperature	pH	SC	ORP	DO
<u>1422</u>						
<u>1424</u>	<u>0.5</u>	<u>12.8</u>	<u>7.19</u>	<u>1321</u>	<u>-79.3</u>	<u>0.50</u>
<u>1425</u>	<u>1.0</u>	<u>13.2</u>	<u>6.89</u>	<u>1332</u>	<u>-80.7</u>	<u>0.41</u>
<u>1427</u>	<u>1.5</u>	<u>13.7</u>	<u>6.81</u>	<u>1317</u>	<u>-86.6</u>	<u>0.30</u>
<u>1429</u>	<u>2.0</u>	<u>13.7</u>	<u>6.81</u>	<u>1314</u>	<u>-88.4</u>	<u>0.26</u>
<u>1431</u>						

## WELL SAMPLING

Sampling Method: ☒ Disposable Poly Bailer, ☐ Submersible Pump, ☐ Low Flow, ☐ Per Pump Sample Type: ☒ Natural, ☐ Duplicate, ☐ Field Blank

Parameter	Sample Container	Preservation
BTEX	(2) 40 ml VOA	Hydrochloric acid
MTBE	Extracted from BTEX VOA	Hydrochloric acid
GRO as Gasoline	(2) 40 ml VOA	Hydrochloric acid
DRO as Diesel	(2) 1-liter amber glass	Sulfuric acid
Methane	(2) 40 ml VOA	None
Sulfate	(1) 250 ml poly plastic	None
HACH	(1) 1-liter poly plastic	None
Lead	(1) 125 ml poly plastic	Nitric acid
VPH	(3) 40 ml VOA	Hydrochloric acid
EPH	(2) 1-liter amber glass	Hydrochloric acid
PAHs	(2) 1-liter amber glass	None
VOC's	(4) 40 ml VOA	Hydrochloric acid

<input checked="" type="checkbox"/> Nitrate/Nitrogen	<u>500 ml</u>	<u>Sulfuric</u>
<input checked="" type="checkbox"/> Sulfate	(1) 425-ml poly plastic	Sulfuric
<input checked="" type="checkbox"/> Sulfide	(1) 125 ml poly plastic	None
<input checked="" type="checkbox"/> Nitrate	(1) 125 ml poly plastic	None
<input checked="" type="checkbox"/> Methane/Ethane/Propane	<u>2</u> (1) 400-ml poly plastic <u>400 ml VOA</u>	Sulfide
<input checked="" type="checkbox"/> Iron/Manganese	(1) 400-ml poly plastic	Nitric

Laboratory: ☐ Quantara, ☐ Microseps, ☐ STL, ☐ Northern Analytical, ☐ Gulf Coast, Other: LANCASTER Chain-of-Custody: ☒ Yes, ☐ No

Meter	Serial No.	Calibration Date	Decontamination
pH	<u>OAKTON</u>	<u>11/27/06</u>	Potable Water: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Nitric Acid: Yes <input type="checkbox"/> No <input type="checkbox"/>
SC	<u>11</u>	<u>11/27/06</u>	Ultrasonic: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> DI Water: Yes <input type="checkbox"/> No <input type="checkbox"/>
ORP	<u>YSI 950</u>	<u>11/27/06</u>	Methanol: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
DO			

Comments: \_\_\_\_\_

# CONOCOPHILLIPS, INC. - GROUNDWATER SAMPLING LOG

Project: COULSON PARK Sample Date: 11/27/06 Sample Time: 1358 Well ID: MW-3  
 Personnel: RYAN SPARHAWK Weather: cloudy - 15°F  
 Casing Diameter/Type: 2" PVC Measuring Point Description: NORTH  
 Well Depth (feet below measuring point): 18.31 Depth to Water: 14.45 ft water  
 Screen: \_\_\_\_\_ Depth to Product: \_\_\_\_\_  
 J-TUBE: YES or NO If yes indicate the depth below static water the tube was raised to Before Sampling: \_\_\_\_\_

## WELL EVACUATION

Method: ☒ Mechanical Bailer, ☐ Galvanized Bailer, ☐ PVC Bailer, ☐ Disp. Polyethylene Bailer, ☐ SST Bailer, ☐ Submersible Pump, ☐ Low Flow, ☐ Per Pump  
3.86 Ft. water x \_\_\_\_\_ gal./ft. = one casing volume 0.6 gals. x 3 = purge volume 1.8 gals.

SCH 40 Pipe 2" well = 0.163 gal./ft. 4" well = 0.653 gal./ft. 6" well = 1.468 gal./ft. 8" well = 2.611 gal./ft. Any Well C feet in radius =  $3.14 \times R^2 \times L$

Water Quality: \_\_\_\_\_ ODOR: YES or NO SHEEN: YES or NO

Comments: \_\_\_\_\_

## EVACUATION DATA

Time	Gallons	Temperature	pH	SC	ORP	DO
1350						
1352	+0.5	12.3	7.23	1166	-150.3	0.20
1354	1.0	13.1	7.19	1146	-160.1	0.14
1356	1.5	13.1	7.17	1132	-170.6	0.12
sample 1358						

## WELL SAMPLING

Sampling Method: ☐ Disposable Poly Bailer, ☐ Submersible Pump, ☐ Low Flow, ☐ Per Pump Sample Type: ☐ Natural, ☐ Duplicate, ☐ Field Blank

Parameter	Sample Container	Preservative
BTEX	(2) 40 ml VOA	Hydrochloric acid
MTBE	Extracted from BTEX VOA	Hydrochloric acid
GRO as Gasoline	(2) 40 ml VOA	Hydrochloric acid
DRO as Diesel	(2) 1-liter amber glass	Sulfuric acid
Methane	(2) 40 ml VOA	None
Sulfate	(1) 250 ml poly plastic	None
HACH	(1) 1-liter poly plastic	None
Lead	(1) 125 ml poly plastic	Nitric acid
VPH	(3) 40 ml VOA	Hydrochloric acid
EPH	(2) 1-liter amber glass	Hydrochloric acid
PAHs	(2) 1-liter amber glass	None
VOC's	(4) 40 ml VOA	Hydrochloric acid

IB's	Sulfate	(1) 400 ml poly plastic	Sulfuric
	Sulfide	(1) 125 ml poly plastic	None
	Nitrate	(1) 125 ml poly plastic	None
	Methane/Ethane/Ethane	(2) 1-liter poly plastic	Sulfide
	Iron/Manganese	(1) 125 ml poly plastic	Nitric

Laboratory: ☐ QUANTITIES ☐ MICROSEPS ☐ STL ☐ Northern Analytical ☐ Gulf Coast Other LANCASTER Filtered: ☒ Yes, ☐ No

Meter	Serial No.	Calibration Date	Decontamination
pH	<u>041000</u>	<u>11-27-06</u>	Potable Water: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
SC	<u>11</u>	<u>11</u>	Nitric Acid: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
ORP	<u>11</u>	<u>11</u>	Liquinac: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
DO	<u>450230</u>	<u>11</u>	Methanol: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Comments: \_\_\_\_\_

Project: COULSON PARK Sample Date: 11/27/06 Sample Time: 1358 Well ID: DUP-MW-3  
 Personnel: RYAN SPARHAWK Weather: \_\_\_\_\_  
 Casing Diameter/Type: 2" PVC Measuring Point Description: NORTH  
 Well Depth (feet below measuring point): 18.31 Depth to Water: 14.47 ft water  
 Screen: \_\_\_\_\_ Depth to Product: \_\_\_\_\_  
 J-TUBE: YES or NO If yes indicate the depth below static water the tube was raised to Before Sampling: \_\_\_\_\_

Method: ☐ Mechanical Bailer, ☐ Galvanized Bailer, ☐ PVC Bailer, ☐ Disp. Polyethylene Bailer, ☐ SST Bailer, ☐ Submersible Pump, ☐ Low Flow, ☐ Perf Pump

\_\_\_\_\_ Ft. water x \_\_\_\_\_ gal./ft.<sup>3</sup> = one casing volume \_\_\_\_\_ gals. x 3 = purge volume \_\_\_\_\_ gals.

Water Quality: \_\_\_\_\_ ODOOR: YES or NO \_\_\_\_\_ SHEEN: YES or NO \_\_\_\_\_

Comments: \_\_\_\_\_

[illegible]

Sampling Method: ☐ Disposable Poly Baller, ☐ Submersible Pump, ☐ Low Flow, ☐ Per Pump \_\_\_\_\_ Sample Type: ☐ Natural, ☐ Duplicate, ☐ Field Blank

Parameter	Sample Container	Preservative
BTEX	(2) 40 ml VOA	Hydrochloric acid
MTBE	Extracted from BTEX VOA	Hydrochloric acid
GRO as Gasoline	(2) 40 ml VOA	Hydrochloric acid
DRO as Diesel	(2) 1-liter amber glass	Sulfuric acid
Methane	(2) 40 ml VOA	None
Sulfate	(1) 250 ml poly plastic	None
HACH	(1) 1-liter poly plastic	None
Lead	(1) 125 ml poly plastic	Nitric acid
VPH	(3) 40 ml VOA	Hydrochloric acid
EPH	(2) 1-liter amber glass	Hydrochloric acid
PAHs	(2) 1-liter amber glass	None
VOC'S	(4) 40 ml VOA	Hydrochloric acid

Filtered: ☐ Yes, ☐ No

[ ]	Sulfate	(1) 125 ml poly plastic	Sulfuric	
[ ]	Sulfide	(1) 125 ml poly plastic	None	
[ ]	Nitrate	(1) 125 ml poly plastic	None	
[ ]	Methane/Ethane/Ethene	(1) 125 ml poly plastic	Sulfide	
[ ]	Iron/Manganese	(1) 125 ml poly plastic	Nitric	Filtered: [ ] Yes, [ ] No

Laboratory: ☐ Quanterra ☐ Microsemps ☐ STL ☐ Northern Analytical ☐ Gulf Coast Other Lancaster Chain-of-Custody: ☒ Yes ☐ No

Meter	Serial No.	Calibration Date	Decontamination
pH	<u>Oakton</u>	<u>11-27-06</u>	Potable Water: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
SC			Nitric Acid: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
ORP			Liquinox: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
DO	<u>YSI 530</u>		Methanol: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
			DI Water: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Comments:

Project: COLLSON PARK Sample Date: 11/27/06 Sample Time: 1321 Well ID: CCP-MW-1  
 Personnel: RYAN SPANZAWK Weather: Cloudy - 5°F  
 Casing Diameter/Type: 2" PVC Measuring Point Description: N<sup>th</sup>  
 Well Depth (feet below measuring point): 17.20 Depth to Water: 14.79 ft water  
 Screen: \_\_\_\_\_ Depth to Product: \_\_\_\_\_  
 J-TUBE: YES or NO If yes indicate the depth below static water the tube was raised to Before Sampling: \_\_\_\_\_

Method: ☐ Mechanical Beller, ☐ Galvanized Beller, ☐ PVC Beller, ☐ Diap. Polyethylene Beller, ☐ SST Beller, ☐ Submersible Pump, ☐ Low Flow, ☒ Per Pump

2.21 Ft. water x 0.4 gal. ft<sup>3</sup> = one casing volume 1.3 gals. x 3 = purge volume 3.9 gals.

SCH 40 Pipe 2" wall = 0.163 gal./ft.    4" wall = 0.653 gal./ft.    6" wall = 1.408 gal./ft.    8" wall = 2.611 gal./ft.    Any Well C feet in radius =  $3.14 \times R^2 \times C$

Water Quality: Clear ODOR: YES ☐ NO ☒ SHEEN: YES ☐ NO ☒

**Comments:** \_\_\_\_\_

[illegible]

Sampling Method: ☒ Disposable Poly Baller, ☐ Submersible Pump, ☐ Low Flow, ☐ Per Pump \_\_\_\_\_ Sample Type: ☐ Natural, ☐ Duplicate, ☐ Field Blank

<u>Parameter</u>	<u>Sample Container</u>	<u>Preservative</u>
BTEX	(2) 40 ml VOA	Hydrochloric acid
MTBE	Extracted from BTEX VOA	Hydrochloric acid
GFO as Gasoline	(2) 40 ml VOA	Hydrochloric acid
DFO as Diesel	(2) 1-liter amber glass	Sulfuric acid
Methane	(2) 40 ml VOA	None
Sulfide	(1) 250 ml poly plastic	None
NACH	(1) 1-liter poly plastic	None
Lead	(1) 125 ml poly plastic	Nitric acid
VPH	(3) 40 ml VOA	Hydrochloric acid
EPH	(2) 1-liter amber glass	Hydrochloric acid
PAHs	(2) 1-liter amber glass	None
VOC'S	(4) 40 ml VOA	Hydrochloric acid

Filtered: ☒ Yes, ☐ No

IS's				
	Sulfate	(1) 400-ml poly plastic		Sulfate
	Sulfide	(1) 125 ml poly plastic		None
	Nitrate	(1) 125 ml poly plastic		None
	Methane/Ethane/Ethane	(1) 400-ml poly plastic	40ml voc	Sulfide
	Iron/Manganese	(1) 400-ml poly plastic		Nitric
				Filtered:
				Yes, [ ] No

Laboratory: ☐ Quanterra: ☐ Microscope: ☐ STL: ☐ Northern Analytical: ☐ Gulf Coast: ☐ Other: Granger Chain-of-Custody: ☒ Yes, ☐ No

Meter	Serial No.	Collection Date	Disinfection					
PH	Oakton	11-27-06	Potable Water:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Nitric Acid:	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
SC			Liquorac:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Cl Water:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
ORP			Methanol:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
DO								

Comments: \_\_\_\_\_

**ATTACHMENT B**  
**LABORATORY ANALYTICAL REPORTS**



## Analysis Report

2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 • 717-658-2300 Fax: 717-656-2681 • www.lancasterlabs.com

### ANALYTICAL RESULTS

Prepared for:

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

Prepared by:

Lancaster Laboratories  
2425 New Holland Pike  
Lancaster, PA 17605-2425

### SAMPLE GROUP

The sample group for this submittal is 1015627. Samples arrived at the laboratory on Tuesday, November 28, 2006. The PO# for this group is 4507261467 and the release number is KINGER.

<u>Client Description</u>	<u>Lancaster Labs Number</u>
MW-1 Grab Water Sample	4924310
MW-3 Grab Water Sample	4924311
DUP-MW-3 Grab Water Sample	4924312
CCP-MW-1 Grab Water Sample	4924313
Trip Blank Water Sample	4924314

### METHODOLOGY

The specific methodologies used in obtaining the enclosed analytical results are indicated on the laboratory chronicles.

1 COPY TO      Data Package Group  
ELECTRONIC    Tetra Tech, Inc  
COPY TO

Attn: David Tyler





## ***Analysis Report***

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Questions? Contact your Client Services Representative  
Barbara A Weyandt at (717) 656-2300

Respectfully Submitted,

A handwritten signature in cursive script that reads "Max E. Snavely".

Max E. Snavely  
Senior Specialist



# Analysis Report

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Lancaster Laboratories Sample No. NW 4924310

MW-1 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 14:31 by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUM1 SDG#: BMT20-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method	As Received Limit of Quantitation	Units	Dilution Factor
01754	Iron	7439-89-6	8.88	0.0522	0.200	mg/l	1
07058	Manganese	7439-96-5	0.795	0.00036	0.0050	mg/l	1
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	mg/l	1
00220	Nitrate Nitrogen	14797-55-8	N.D.	0.040	0.10	mg/l	1
00228	Sulfate	14808-79-8	700.	15.0	50.0	mg/l	50
05869	MT-VPH Waters						
05877	Total Purgeable Hydrocarbons	n.a.	96.6 J	20.0	100.	ug/l	1
05943	Xylenes (total)	1330-20-7	N.D.	1.00	10.0	ug/l	1
05993	Benzene	71-43-2	N.D.	0.5	1.00	ug/l	1
05994	Toluene	108-88-3	N.D.	0.5	5.00	ug/l	1
05995	Ethylbenzene	100-41-4	N.D.	0.5	5.00	ug/l	1
05996	Methyl t-butyl ether	1634-04-4	N.D.	2.00	5.00	ug/l	1
05997	Naphthalene	91-20-3	N.D.	1.00	5.00	ug/l	1
05998	C5-C8 Aliphatic Hydrocarbons	n.a.	71.4 J	50.0	100.	ug/l	1
05999	C9-C12 Aliphatic Hydrocarbons	n.a.	N.D.	20.0	100.	ug/l	1
06002	C9-C10 Aromatic Hydrocarbons	n.a.	N.D.	20.0	100.	ug/l	1
06003	Unadjusted C5-C8 Aliphatics	n.a.	72.5 J	50.0	100.	ug/l	1
06004	Unadjusted C9-C12 Aliphatics	n.a.	24.2 J	20.0	100.	ug/l	1

The concentrations of individual target analytes and the surrogate standard have been subtracted from the concentrations of the appropriate hydrocarbon ranges as specified by the method.

Elution ranges for the target analytes are listed below:  
benzene, toluene, methyl t-butyl ether - C5-C8 aliphatics  
ethyl benzene, m,p-xylenes, o-xylene - C9-C12 aliphatics

Significant modifications to the method are listed below:  
The surrogate standard for the VPH analysis is a,a,a-trifluorotoluene for both the PID and FID. This compound elutes in the C5-C8 range. 1-Chloro-3-fluorobenzene is also used as an internal standard for the PID and elutes in the C5-C8 range. The use of the internal standard, surrogate standard that elute in the specified aliphatic or aromatic ranges is a significant modification. The peak areas for these standards are subtracted from the area for the specific ranges before the concentrations are calculated. This process has been validated in our laboratory and has produced acceptable data in the MA Round Robin study. Sample preservation met requirements (pH <= 2).

The table below lists the risk based screening levels (RBSL) used by the state of Montana. The limits are from the Tier 1 Groundwater RBSLs and Standards table. These limits are posted on the Montana DEQ web site (www.deq.state.mt.us). The limits were last updated October 2003.

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Lancaster Laboratories Sample No. WW 4924310

MW-1 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 14:31 by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUM1 SDG#: BMT20-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
	Analyte Name	RBSL (ug/l)					
	Xylenes	10000					
	Benzene	5					
	Toluene	1000					
	Ethylbenzene	700					
	MTBE	30					
	Naphthalene	100					
	C5-C8 Aliphatics	350					
	C9-C12 Aliphatics	1000					
	C9-C10 Aromatics	100					
07105	Volatile Headspace Hydrocarbon						
07106	Methane	74-82-8	1,100.	200.	500.	ug/l	100

This sample was field filtered for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010B	1	12/01/2006 13:08	Joanne M Gates	1
07058	Manganese	SW-846 6010B	1	12/01/2006 13:08	Joanne M Gates	1
00219	Nitrite Nitrogen	EPA 353.2	1	11/28/2006 22:22	Courtney A Shoff	1
00220	Nitrate Nitrogen	EPA 353.2	1	11/30/2006 01:50	Brian C Vesty	1
00228	Sulfate	EPA 300.0	1	12/01/2006 00:26	Ashley M Heckman	50
05869	MT-VPH Waters	MA DEP VPH mod/SW-846 8021B	1	11/30/2006 15:01	K. Robert Caulfeild-James	1
07105	Volatile Headspace Hydrocarbon	SW-846 8015B modified	1	12/04/2006 14:04	Hai D Nguyen	100
01848	WW SW846 ICP Digest (tot rec)	SW-846 3005A	1	12/01/2006 00:15	Helen L Schaeffer	1

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Page 1 of 2

Lancaster Laboratories Sample No. WW 4924311

MW-3 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 13:58

by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUM3 SDG#: BMT20-02

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
01754	Iron	7439-89-6	8.46	0.0522	0.200	mg/l	1
07058	Manganese	7439-96-5	0.116	0.00036	0.0050	mg/l	1
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	mg/l	1
00220	Nitrate Nitrogen	14797-55-8	N.D.	0.040	0.10	mg/l	1
00228	Sulfate	14808-79-8	93.5	15.0	50.0	mg/l	50
05869	MT-VPH Waters						
05877	Total Purgeable Hydrocarbons	n.a.	1,140.	20.0	100.	ug/l	1
05943	Xylenes (total)	1330-20-7	1.52 J	1.00	10.0	ug/l	1
05993	Benzene	71-43-2	249.	0.5	1.00	ug/l	1
05994	Toluene	108-88-3	2.52 J	0.5	5.00	ug/l	1
05995	Ethylbenzene	100-41-4	2.58 J	0.5	5.00	ug/l	1
05996	Methyl t-butyl ether	1634-04-4	N.D.	2.00	5.00	ug/l	1
05997	Naphthalene	91-20-3	3.49 J	1.00	5.00	ug/l	1
05998	C5-C8 Aliphatic Hydrocarbons	n.a.	621.	50.0	100.	ug/l	1
05999	C9-C12 Aliphatic Hydrocarbons	n.a.	100.	20.0	100.	ug/l	1
06002	C9-C10 Aromatic Hydrocarbons	n.a.	167.	20.0	100.	ug/l	1
06003	Unadjusted C5-C8 Aliphatics	n.a.	872.	50.0	100.	ug/l	1
06004	Unadjusted C9-C12 Aliphatics	n.a.	272.	20.0	100.	ug/l	1

The concentrations of individual target analytes and the surrogate standard have been subtracted from the concentrations of the appropriate hydrocarbon ranges as specified by the method.

Elution ranges for the target analytes are listed below:  
benzene, toluene, methyl t-butyl ether - C5-C8 aliphatics  
ethyl benzene, m,p-xylenes, o-xylene - C9-C12 aliphatics

Significant modifications to the method are listed below:

The surrogate standard for the VPH analysis is a,a,a-trifluorotoluene for both the PID and FID. This compound elutes in the C5-C8 range. 1-Chloro-3-fluorobenzene is also used as an internal standard for the PID and elutes in the C5-C8 range. The use of the internal standard, surrogate standard that elute in the specified aliphatic or aromatic ranges is a significant modification. The peak areas for these standards are subtracted from the area for the specific ranges before the concentrations are calculated. This process has been validated in our laboratory and has produced acceptable data in the MA Round Robin study. Sample preservation met requirements (pH <= 2).

The table below lists the risk based screening levels (RBSL) used by the state of Montana. The limits are from the Tier 1 Groundwater RBSLs and Standards table. These limits are posted on the Montana DEQ web site (www.deq.state.mt.us). The limits were last updated October 2003.

\*=This limit was used in the evaluation of the final result



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Lancaster Laboratories Sample No. WW 4924311

MW-3 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 13:58 by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUM3 SDG#: BMT20-02

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
	Analyte Name	RBSL (ug/l)					
	Xylenes	10000					
	Benzene	5					
	Toluene	1000					
	Ethylbenzene	700					
	MTBE	30					
	Naphthalene	100					
	C5-C8 Aliphatics	350					
	C9-C12 Aliphatics	1000					
	C9-C10 Aromatics	100					

The concentration for the following analytes exceeded the RBSL:  
benzene, C5-C8 aliphatics, C9-C10 aromatics

07105 Volatile Headspace  
Hydrocarbon

07106	Methane	74-82-8	2,000.	200.	500.	ug/l	100
-------	---------	---------	--------	------	------	------	-----

This sample was field filtered for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010B	1	12/01/2006 13:22	Joanne M Gates	1
07058	Manganese	SW-846 6010B	1	12/01/2006 13:22	Joanne M Gates	1
00219	Nitrite Nitrogen	EPA 353.2	1	11/28/2006 22:24	Courtney A Shoff	1
00220	Nitrate Nitrogen	EPA 353.2	1	11/30/2006 01:51	Brian C Veety	1
00228	Sulfate	EPA 300.0	1	12/01/2006 00:42	Ashley M Heckman	50
05869	MT-VPH Waters	MA DEP VPH mod/SW-846 8021B	1	11/30/2006 22:41	K. Robert Caulfeild-James	1
07105	Volatile Headspace Hydrocarbon	SW-846 8015B modified	1	12/04/2006 14:45	Hai D Nguyen	100
01848	WW SW846 ICP Digest (tot rec)	SW-846 3005A	1	12/01/2006 00:15	Helen L Schaeffer	1

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Lancaster Laboratories Sample No. WW 4924312

DUP-MW-3 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 13:58 by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUFD SDG#: BMT20-03FD

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
05869	MT-VPH Waters						
05877	Total Purgeable Hydrocarbons	n.a.	1,150.	20.0	100.	ug/l	1
05943	Xylenes (total)	1330-20-7	1.59 J	1.00	10.0	ug/l	1
05993	Benzene	71-43-2	243.	0.5	1.00	ug/l	1
05994	Toluene	108-88-3	2.46 J	0.5	5.00	ug/l	1
05995	Ethylbenzene	100-41-4	2.50 J	0.5	5.00	ug/l	1
05996	Methyl t-butyl ether	1634-04-4	N.D.	2.00	5.00	ug/l	1
05997	Naphthalene	91-20-3	2.69 J	1.00	5.00	ug/l	1
05998	C5-C8 Aliphatic Hydrocarbons	n.a.	644.	50.0	100.	ug/l	1
05999	C9-C12 Aliphatic Hydrocarbons	n.a.	93.1 J	20.0	100.	ug/l	1
06002	C9-C10 Aromatic Hydrocarbons	n.a.	161.	20.0	100.	ug/l	1
06003	Unadjusted C5-C8 Aliphatics	n.a.	890.	50.0	100.	ug/l	1
06004	Unadjusted C9-C12 Aliphatics	n.a.	258.	20.0	100.	ug/l	1

The concentrations of individual target analytes and the surrogate standard have been subtracted from the concentrations of the appropriate hydrocarbon ranges as specified by the method.

Elution ranges for the target analytes are listed below:  
benzene, toluene, methyl t-butyl ether - C5-C8 aliphatics  
ethyl benzene, m,p-xylenes, o-xylene - C9-C12 aliphatics

Significant modifications to the method are listed below:

The surrogate standard for the VPH analysis is a,a,a-trifluorotoluene for both the PID and FID. This compound elutes in the C5-C8 range. 1-Chloro-3-fluorobenzene is also used as an internal standard for the PID and elutes in the C5-C8 range. The use of the internal standard, surrogate standard that elute in the specified aliphatic or aromatic ranges is a significant modification. The peak areas for these standards are subtracted from the area for the specific ranges before the concentrations are calculated. This process has been validated in our laboratory and has produced acceptable data in the MA Round Robin study. Sample preservation met requirements (pH <= 2).

The table below lists the risk based screening levels (RBSL) used by the state of Montana. The limits are from the Tier 1 Groundwater RBSLs and Standards table. These limits are posted on the Montana DEQ web site ([www.deq.state.mt.us](http://www.deq.state.mt.us)). The limits were last updated October 2003.

Analyte Name	RBSL (ug/l)
Xylenes	10000
Benzene	5
Toluene	1000
Ethylbenzene	700

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Lancaster Laboratories Sample No. WW 4924312

DUP-MW-3 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 13:58 by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUFD SDG#: BMT20-03FD

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
	MTBE	30					
	Naphthalene	100					
	C5-C8 Aliphatics	350					
	C9-C12 Aliphatics	1000					
	C9-C10 Aromatics	100					

The concentration for the following analytes exceeded the RBSL:  
benzene, C5-C8 aliphatics, C9-C10 aromatics

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
05869	MT-VPK Waters	MA DEP VPK mod/SW-846 8021B	1	12/01/2006 00:04	K. Robert Caulfeild-James	1

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Lancaster Laboratories Sample No. WW 4924313

CCP-MW-1 Grab Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/27/2006 13:21 by RS

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COU-1 SDG#: BMT20-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method	As Received Limit of	Units	Dilution Factor
				Detection Limit*	Quantitation		
01754	Iron	7439-89-6	N.D.	0.0522	0.200	mg/l	1
07058	Manganese	7439-96-5	0.0987	0.00036	0.0050	mg/l	1
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	mg/l	1
00220	Nitrate Nitrogen	14797-55-8	0.37	0.040	0.10	mg/l	1
00228	Sulfate	14808-79-8	336.	15.0	50.0	mg/l	50
07105	Volatile Headspace Hydrocarbon						
07106	Methane	74-82-8	N.D.	2.0	5.0	ug/l	1

This sample was field filtered for dissolved metals.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis	Analyst	Dilution Factor
				Date and Time		
01754	Iron	SW-846 6010B	1	12/01/2006 13:27	Joanne M Gates	1
07058	Manganese	SW-846 6010B	1	12/01/2006 13:27	Joanne M Gates	1
00219	Nitrite Nitrogen	EPA 353.2	1	11/28/2006 22:25	Courtney A Shoff	1
00220	Nitrate Nitrogen	EPA 353.2	1	11/30/2006 01:53	Brian C Veety	1
00228	Sulfate	EPA 300.0	1	12/01/2006 00:57	Ashley M Heckman	50
07105	Volatile Headspace Hydrocarbon	SW-846 8015B modified	1	11/30/2006 21:13	Hai D Nguyen	1
01848	WW SW846 ICP Digest (tot rec)	SW-846 3005A	1	12/01/2006 00:15	Helen L Schaeffer	1

\*=This limit was used in the evaluation of the final result





# Analysis Report

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Lancaster Laboratories Sample No. WW 4924314

Trip Blank Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/10/2006

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUTB SDG#: BMT20-05TB\*

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
05869	MT-VPH Waters						
05877	Total Purgeable Hydrocarbons	n.a.	N.D.	20.0	100.	ug/l	1
05943	Xylenes (total)	1330-20-7	N.D.	1.00	10.0	ug/l	1
05993	Benzene	71-43-2	N.D.	0.5	1.00	ug/l	1
05994	Toluene	108-88-3	N.D.	0.5	5.00	ug/l	1
05995	Ethylbenzene	100-41-4	N.D.	0.5	5.00	ug/l	1
05996	Methyl t-butyl ether	1634-04-4	N.D.	2.00	5.00	ug/l	1
05997	Naphthalene	91-20-3	N.D.	1.00	5.00	ug/l	1
05998	C5-C8 Aliphatic Hydrocarbons	n.a.	N.D.	50.0	100.	ug/l	1
05999	C9-C12 Aliphatic Hydrocarbons	n.a.	N.D.	20.0	100.	ug/l	1
06002	C9-C10 Aromatic Hydrocarbons	n.a.	N.D.	20.0	100.	ug/l	1
06003	Unadjusted C5-C8 Aliphatics	n.a.	N.D.	50.0	100.	ug/l	1
06004	Unadjusted C9-C12 Aliphatics	n.a.	N.D.	20.0	100.	ug/l	1

The concentrations of individual target analytes and the surrogate standard have been subtracted from the concentrations of the appropriate hydrocarbon ranges as specified by the method.

Elution ranges for the target analytes are listed below:  
benzene, toluene, methyl t-butyl ether - C5-C8 aliphatics  
ethyl benzene, m,p-xylenes, o-xylene - C9-C12 aliphatics

Significant modifications to the method are listed below:

The surrogate standard for the VPH analysis is a,a,a-trifluorotoluene for both the PID and FID. This compound elutes in the C5-C8 range. 1-Chloro-3-fluorobenzene is also used as an internal standard for the PID and elutes in the C5-C8 range. The use of the internal standard, surrogate standard that elute in the specified aliphatic or aromatic ranges is a significant modification. The peak areas for these standards are subtracted from the area for the specific ranges before the concentrations are calculated. This process has been validated in our laboratory and has produced acceptable data in the MA Round Robin study. Sample preservation met requirements (pH <= 2).

The table below lists the risk based screening levels (RBSL) used by the state of Montana. The limits are from the Tier 1 Groundwater RBSLs and Standards table. These limits are posted on the Montana DEQ web site ([www.deq.state.mt.us](http://www.deq.state.mt.us)). The limits were last updated October 2003.

Analyte Name	RBSL (ug/l)
Xylenes	10000
Benzene	5
Toluene	1000
Ethylbenzene	700

\*=This limit was used in the evaluation of the final result



# Analysis Report

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Lancaster Laboratories Sample No. WW 4924314

Trip Blank Water Sample  
Site# 6625  
Coulson Park, MT

Collected: 11/10/2006

Account Number: 11288

Submitted: 11/28/2006 09:35  
Reported: 12/07/2006 at 08:47  
Discard: 01/07/2007

ConocoPhillips  
PO Box 2200  
Bartlesville OK 74005

COUTB SDG#: BMT20-05TB\*

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Units	Dilution Factor
	MTBE	30					
	Naphthalene	100					
	C5-C8 Aliphatics	350					
	C9-C12 Aliphatics	1000					
	C9-C10 Aromatics	100					

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

## Laboratory Chronicle

CAT No.	Analysis Name	Method	Trial#	Analysis Date and Time	Analyst	Dilution Factor
05869	MT-VPH Waters	MA DEP VPH mod/SW-846 8021B	1	11/30/2006 14:20	K. Robert Caulfeild-James	1

\*=This limit was used in the evaluation of the final result

## Quality Control Summary

Client Name: ConocoPhillips  
Reported: 12/07/06 at 08:47 AM

Group Number: 1015627

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

## Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 06332105101A Nitrite Nitrogen	Sample number(s): 4924310-4924311,4924313 N.D.	0.015	0.050	mg/l	97		90-110		
Batch number: 063340023A Methane	Sample number(s): 4924310-4924311,4924313 N.D.	2.0	5.0	ug/l	98		80-120		
Batch number: 06334106101B Nitrate Nitrogen	Sample number(s): 4924310-4924311,4924313 N.D.	0.040	0.10	mg/l	103		89-110		
Batch number: 06334196102A Sulfate	Sample number(s): 4924310-4924311,4924313 N.D.	0.30	1.0	mg/l	102		89-110		
Batch number: 06334A01A Total Purgeable Hydrocarbons	Sample number(s): 4924310-4924312,4924314 N.D.	20.0	100.	ug/l	91	93	70-130	3	50
Xylenes (total)	N.D.	1.00	10.0	ug/l	90	92	70-130	3	50
Benzene	N.D.	0.5	1.00	ug/l	86	88	70-130	2	50
Toluene	N.D.	0.5	5.00	ug/l	88	90	70-130	3	50
Ethylbenzene	N.D.	0.5	5.00	ug/l	89	92	70-130	3	50
Methyl t-butyl ether	N.D.	2.00	5.00	ug/l	88	89	70-130	0	50
Naphthalene	N.D.	1.00	5.00	ug/l	82	86	70-130	5	50
C5-C8 Aliphatic Hydrocarbons	N.D.	50.0	100.	ug/l	101	103	70-130	2	50
C9-C12 Aliphatic Hydrocarbons	N.D.	20.0	100.	ug/l	85	89	70-130	5	50
C9-C10 Aromatic Hydrocarbons	N.D.	20.0	100.	ug/l	90	93	70-130	3	50
Unadjusted C5-C8 Aliphatics	N.D.	50.0	100.	ug/l	94	96	70-130	2	50
Unadjusted C9-C12 Aliphatics	N.D.	20.0	100.	ug/l	88	91	70-130	4	50
Batch number: 063351848001 Iron	Sample number(s): 4924310-4924311,4924313 N.D.	0.0522	0.200	mg/l	96		90-112		
Manganese	N.D.	0.00036	0.0050	mg/l	100		90-110		

## Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	BKG	DUP	DUP	Dup RPD
Batch number: 06332105101A Nitrite Nitrogen	Sample number(s): 4924310-4924311,4924313 101	90-110			UNSPK: P924335 0.015 J	BKG: P924335 0.015 J	0 (1)	20
Batch number: 063340023A Methane	Sample number(s): 4924310-4924311,4924313 90	95	63-124	5	UNSPK: 4924310 20			
Batch number: 06334106101B	Sample number(s): 4924310-4924311,4924313				UNSPK: P921637	BKG: P921637		

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The background result was more than four times the spike added.

## Quality Control Summary

Client Name: ConocoPhillips  
Reported: 12/07/06 at 08:47 AM

Group Number: 1015627

### Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike  
Background (BKG) = the sample used in conjunction with the duplicate

	MS	MSD	MS/MSD	RPD	BKG	DUP	DUP	Dup RPD
Analysis Name	%REC	%REC	Limits	RPD	MAX	Conc	Conc	Max
Nitrate Nitrogen	104		90-110			N.D.	N.D.	200* (1)
Batch number: 06334196102A	Sample number(s): 4924310-4924311,4924313 UNSPK: P923432 BKG: P923432							
Sulfate	107		90-110		20.7	19.4	7* (1)	3
Batch number: 063351848001	Sample number(s): 4924310-4924311,4924313 UNSPK: P924299 BKG: P924299							
Iron	107	106	75-125	0	20	1.14	1.24	8
Manganese	103	104	75-125	1	20	0.0767	0.0822	7

### Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Volatile Headspace Hydrocarbon  
Batch number: 063340023A  
Propene

4924310	93
4924311	98
4924313	57
Blank	90
LCS	82
MS	90
MSD	96

Limits: 38-129

Analysis Name: MT-VPH Waters

Batch number: 06334A01A

	Trifluorotoluene-P	Trifluorotoluene-F
4924310	95	109
4924311	102	132*
4924312	99	133*
4924314	93	105
Blank	95	106
LCS	99	109
LCSD	98	108

Limits: 70-130 70-130

\*- Outside of specification

\*\* - This limit was used in the evaluation of the final result for the blank

(1) The result for one or both determinations was less than five times the LOQ.

(2) The background result was more than four times the spike added.

# ConocoPhillips Analysis Request/Chain of Custody



05138

For Lancaster Laboratories use only  
Acct. #: 11288 Group #: 1015627 Sample #: 4924310-14

SCR#: 35871

Site #: <u>6625</u> VNO #: _____ Site Address: <u>Coulson Park, MT</u> ConocoPhillips PM: <u>William Muldoon</u> Company Code: _____ Core Work Order#: <u>6625MAX003</u> Total Lab Budget: <u>9677-</u> Consultant/Office: <u>Tetra Tech</u> Consultant Pjt. Mgr: <u>Dave Tyler</u> Consultant Phone #: <u>406-248-9161</u> Fax #: <u>248-9282</u> Sampler: <u>Ryan Sparhawk</u>				Matrix <input type="checkbox"/> P <input type="checkbox"/> W <input type="checkbox"/> OIL <input type="checkbox"/> AIR		Analyses Requested <small>List total number of containers in the box under each analysis.</small> <table border="1"> <tr> <th colspan="10">Preservation Codes</th> </tr> <tr> <td>MT-VBA</td> <td>NH<sub>4</sub>+</td> <td>NO<sub>3</sub>-</td> <td>NO<sub>2</sub>-</td> <td>Fe</td> <td>Mn</td> <td>Cu</td> <td>Zn</td> <td>Pb</td> <td>As</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Preservation Codes										MT-VBA	NH <sub>4</sub> +	NO <sub>3</sub> -	NO <sub>2</sub> -	Fe	Mn	Cu	Zn	Pb	As											Preservative Codes H = HCl T = Thiosulfate N = HNO <sub>3</sub> B = NaOH S = H <sub>2</sub> SO <sub>4</sub> O = Other	
Preservation Codes																																															
MT-VBA	NH <sub>4</sub> +	NO <sub>3</sub> -	NO <sub>2</sub> -	Fe	Mn	Cu	Zn	Pb	As																																						
Sample Identification	Date Collected	Time Collected	Grab	Composite	Soil	Water	OIL	AIR											Remarks																												
MW-1	11-27-06	1431	G			X			X	X	X	X	X	X	X	9 bottles																															
MW-3	11-27-06	1358	G			X			X	X	X	X	X	X	X	9 bottles																															
Dup-MW-3	11-27-06	1358	G			X			X	X	X	X	X	X	X	3 bottles																															
CCP-MW-1	11-27-06	1321	G			X			X	X	X	X	X	X	X	6 bottles																															
Temp Blank						X										1 bottle																															
Trip Blank	11-10-06					X										2 bottles																															
Turnaround Time Requested in Business Days (TAT) (please circle): STD. TAT 5 day 48 hour 24 hour other _____				Relinquished by: <u>Charles</u> Date: <u>11/30/06</u> Time: <u>1200</u>		Received by: <u>Ryan Sparhawk</u> Date: <u>11-20</u> Time: <u>1200</u>																																									
Reporting Requirements (please circle): NJ Reduced NY ASP Cat. A Raw Data Diskette NY ASP Cat. B Full Type I Other _____				Relinquished by: <u>Ryan Sparhawk</u> Date: <u>11-27</u> Time: <u>1300</u>		Received by: _____ Date: _____ Time: _____																																									
				Relinquished by: _____ Date: _____ Time: _____		Received by: _____ Date: _____ Time: _____																																									
				Relinquished by Commercial Carrier: UPS _____ FedEx <u>X</u> Other _____		Temperature Upon Receipt <u>4.4</u> °C																																									

**ATTACHMENT C**  
**QA/QC EVALUATION**

**QUALITY ASSURANCE/QUALITY CONTROL EVALUATION  
NOVEMBER 2006 GROUNDWATER MONITORING EVENT  
COULSON PPARK 1976 SEMINOE PIPE LINE RELEASE, BILLINGS, MONTANA**

Quality control/quality assurance (QA/QC) evaluation includes investigation of the adherence to standard procedures for shipping and analyzing as outlined by the Massachusetts Department of Environmental Protection (MDEP, 1998) as well as discussion of the precision of analyses.

Handling of samples was performed in accordance with Maxim SOPs for sampling and shipping, which is aligned with the MDEP criteria. Samples were collected using proper bottles and preservatives, shipped on ice and received within the temperature and pH ranges specified. Approximately 19 hours after sampling, samples were received by Lancaster in satisfactory condition, within the specified temperature range of  $2^{\circ}\text{C}\pm$ , and all samples were adequately preserved to a pH of  $\leq 2$ . All analyses were performed within the required holding time for the VPH procedure.

A trip blank was shipped with the groundwater samples and analyzed for VPH using the MDEP Method. The trip blank did not contain detectable concentrations of VPH analytes.

Maxim collected a duplicate sample from well MW-3 for analysis of VPH. Evaluation of duplicate samples was done using Relative Percent Difference (RPD) following method criteria specified by the MDEP (MDEP, 1998). RPD is defined as the difference between the natural and duplicate results divided by the mean. For VPH analyses, results are considered to be estimates when the RPD is greater than 50 percent (MDEP, 1998). In the event that an analyte is detected in only one of the natural-duplicate pair, the LOQ for concentrations below detection is used in the QA/QC evaluation. All results meet the RPD criterion of 50 percent between the natural and duplicate samples and must be considered accurate. The internal QA/QC evaluation conducted by Lancaster indicated that all QC was compliant for the Coulson Park samples.